10392

Diagram No. 1286-2

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey ... Side Scan Sonar

Field No. ... WH-10-1-91

Registry No. ... H-10392

LOCALITY

State ... Texas

General Locality ... Gulf of Mexico

Sublocality ... Aransas Pass

1991

CHIEF OF PARTY
CDR R.P. Floyd

LIBRARY & ARCHIVES

DATE ... July 19, 1993

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10392

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTER NOS.

H-10392 (1991)

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

WH-10-1-91

State: TEXAS

General locality: GULF OF MEXICO

Locality: APPROACH TO ARANSAS PASS ~~H-10392: 5 NM East of Port Aransas, Tx~~

Scale: 1:20,000 Date of Survey: July 27 - November 17, 1991

Instructions dated: May 28, 1991 Project No.: OPR-K220-WH

Vessel: NOAA Ship WHITING S-329 EDP # 2930

Chief of party: Commander Richard P. Floyd

Surveyed by: R. Floyd, C. B. Greenawalt, N. Crews, R. Fletcher, K. McNitt, K. Taggart
D. Bixby, E. Berkowitz, J. Seitz, F. Cruz, E. Myers, R. Harris

Soundings taken by echosounder: DSF 6000N

Graphic record scaled by: WHITING Survey Personnel

Graphic record checked by: WHITING Survey personnel

Protracted by: N/A Automated plot by: XYNETICS 1201 PLOTTER (AHS) HP 7959B, Bruning (FIELD)

Verification by: ~~N/A~~ ATLANTIC HYDROGRAPHIC SECTION

Soundings in MLLW: Meters

REMARKS: Change No. 1 dated August 23, 1991

Change No. 2 dated October 1, 1991

Surveyed with 1:20,000 scale standards, plotted at 1:10,000

Field number was erroneously assigned to indicate a 1:10,000 survey

Junctions with H-10399

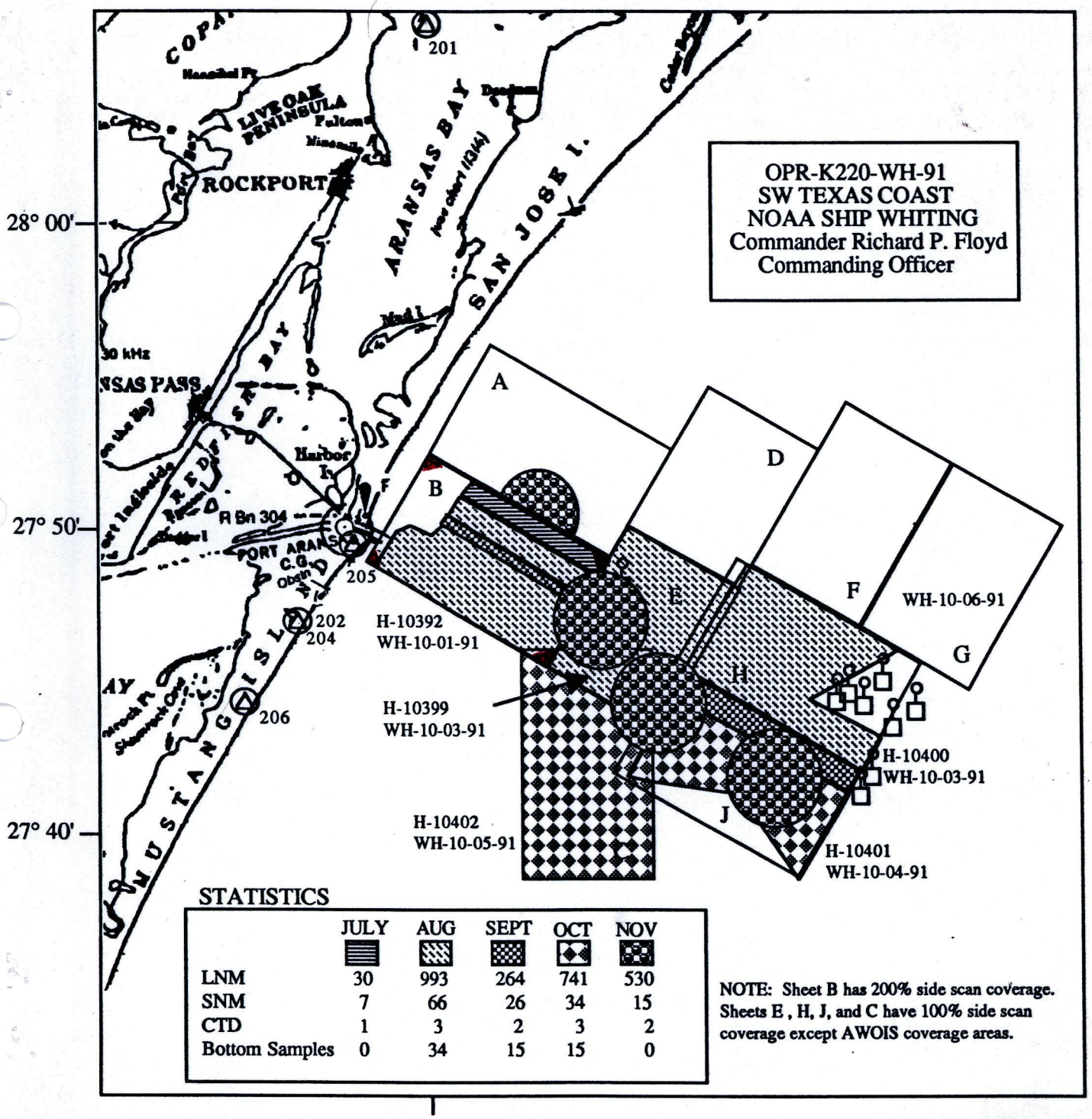
NOTES IN THE ORIGINAL DESCRIPTIVE REPORT WERE MADE IN RED DURING OFFICE PROCESSING.

AWOIS/SURF ✓ 7/22/93 SJV

29 1997

NOAA FORM 77-28 SUPERSEDES FORM C & GS-537

PROGRESS SKETCH
NOAA SHIP WHITING
NOVEMBER 1991



STATISTICS

	JULY	AUG	SEPT	OCT	NOV
LNM	30	993	264	741	530
SNM	7	66	26	34	15
CTD	1	3	2	3	2
Bottom Samples	0	34	15	15	0

NOTE: Sheet B has 200% side scan coverage. Sheets E , H, J, and C have 100% side scan coverage except AWOIS coverage areas.

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-K220-WH
FIELD NUMBER WH-10-1-91
REGISTRY NUMBER H-10392
NOAA SHIP WHITING

Cdr. Richard P. Floyd, Commanding Officer

A. PROJECT

The purpose of this project was to perform a basic hydrographic survey with side scan sonar (SSS) coverage of the approaches to Corpus Christi to support the maintenance of existing nautical charts. Charted wrecks and obstructions were detected and in some cases disproved with 200- or 400-percent SSS coverage. This survey was designated as sheet "B" and assigned a field sheet number of WH-10-1-91 and registry number H-10392.

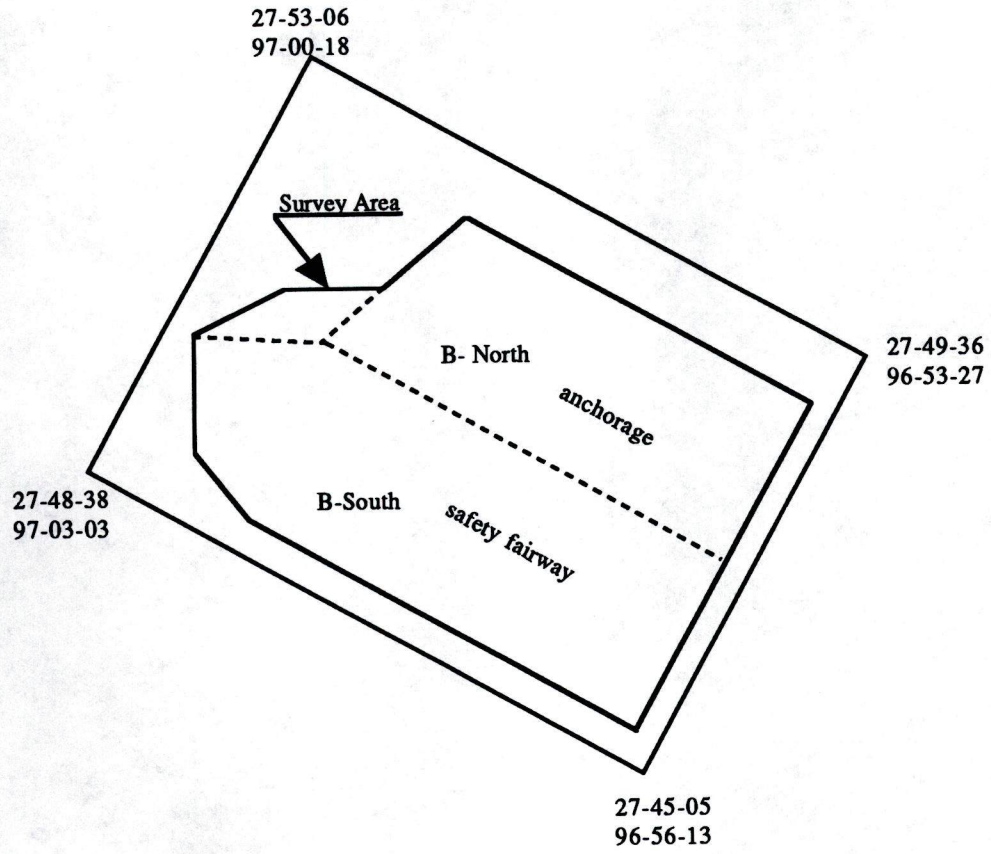
This area is of interest because Port Ingleside, on the north shore of Corpus Christi Bay, is being planned as a major strategic home port for the United States Navy. The area is also economically significant because of the sport and commercial fishing industries.

Survey operations were conducted in accordance with the May 28, 1991, Hydrographic Project Instructions, OPR-K220-WH, S.W. Texas Coast, Texas, with Change Number 1 dated August 14, 1991, and with Change Number 2 dated October 1, 1991.

B. AREA SURVEYED

Hydrographic survey H-10392 encompassed the area from the end of the Aransas Pass jetties southeast 6.5 nautical miles, and from the southern edge of the safety fairway, northeast, 4.1 nautical miles. This included a portion of the safety fairway, and the Aransas Pass anchorage.

The survey was bounded by the following limits:



Survey operations began on July 27, 1991, day of year (DOY) 208 and ended on November 17, 1991 (DOY 321). Survey operations on "B" sheet were sporadic due to bad weather, hardware problems, anchored vessels in the survey area, and operations on other sheets. Approximately 12.5 days were used to conduct survey H-10392. Data were acquired on the following days:

DOY	Gregorian Date
208-209	27-28 July
218-228	6-16 August
233-234	21-22 August
236-237	24-25 August
239	27 August
255	12 September
261-262	18-19 September
265-266	22-23 September
276	3 October
282	9 October
294	21 October
297	24 October
320-321	16-17 November

C. SURVEY VESSEL

The NOAA ship WHITING S-329, EDP number 2930, was the only vessel used to gather data for this survey. WHITING was used for all sounding and SSS acquisition, velocity casts, and detached position (DP) determinations.

WHITING is a 163-foot vessel with a draft of 3.2 meters. SSS performance was impaired in shallow water, when a towfish height of 8 to 20 percent of the range scale put the fish in the prop wash of the WHITING, causing severe interference on the sonargrams. An inordinate amount of time was spent trying to acquire an acceptable SSS trace in depths less than 12 meters.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The Hydrographic Data Acquisition and Processing System (HDAPS) was used to collect and process data for survey H-10392. A listing of the program titles and version numbers can be found in Appendix E. DATA FILED WITH FIELD RECORDS.

The MicroVax program NAVUTL (version 6.0) was used to calculate DP's for the buoys and platforms that were located in the survey area.

The IBM program NADCON (version 1.01) was used to calculate the datum shift from North American Datum (NAD) 83 to NAD 27, to create overlays for comparisons with prior surveys. SEE ALSO SECTION 2.A. OF THE EVALUATION REPORT.

The MicroVax program CALIB (version 2.0) was used to recompute ARGO partial lane correctors using Falcon ranges and ARGO rates recorded during the original calibrations. Recomputation of the partial correctors was necessary due to a position error in one of the calibration network stations. SEE ALSO SECTION 1.D. OF THE EVALUATION REPORT.

The HDAPS program RECOMP (version 1.04) was used to recalculate positions by applying the re-computed ARGO partial lane correctors, which differed from those applied while on line.

The HDAPS program POINT (version 2.03) was used to recalculate DP's by applying the recomputed ARGO partial lane correctors, which differed from those applied while on line.

All sound velocity computations were determined using programs CAT (version 1.0) and VELOCITY (version 1.11).

E. SIDE SCAN SONAR EQUIPMENT

WHITING maintained 24-hour shipboard data acquisition and processing throughout the survey (weather permitting). An EG&G model 272-T dual-channel towfish was towed at a speed of 5 to 6 knots from a block attached to an A-frame support on the fantail of WHITING. The operating frequency of the SSS was 100 kHZ and the range scale was 100 meters for each channel (port and starboard) resulting in a 200-meter swath width. Sounding lines were offset by 80 meters to obtain 200-percent bottom coverage and a swath overlap of 4 millimeters at the scale of the survey. Data were recorded by an EG&G model 260 Image Correcting Side Scan Sonar System. The following is a list of SSS equipment serial numbers and dates of use:

Type	S/N	DOY
Towfish	011901	224-234, 265-276, 321
Towfish	011904	208-223, 236-262, 282-320
260 Recorder	0012102	208-239, 265-266, 276, 294-320
260 Recorder	0012106	261-262, 276, 282

The towfish height was maintained between 8 and 20 meters off the bottom. To ensure 200-percent coverage, two 100-percent swath extent plots were produced by including every other survey line on each plot. The plots were examined to verify that adequate coverage was maintained. After recomputation of data a 10- x 200-meter holiday in the 200-percent coverage was found at latitude 27°50'45"N longitude 96°59'56"W. This holiday is shown on B-North swath plot "B".

Data were rejected in areas too shallow to acquire adequate swath coverage. The near-shore survey boundaries were modified because WHITING had difficulty collecting acceptable side scan sonargrams in depths less than 12 meters. The depth of water surveyed ranged from 10 to 21 meters.

Confidence checks were performed at least twice daily to confirm the reliability of the side scan sonargram to the outer limits of the range scale in use. This was accomplished by one of two methods. The first involved towing the SSS fish between 80 and 100 meters away from a buoy and observing the return on the sonargram. Two passes were required for this method to test both the port and starboard channels. The second method involved towing the SSS towfish over known bottom features that extended the full width of the range scale. These checks were often obtained during the normal course of running survey lines.

Side scan sonargrams were examined by WHITING personnel and cartographic technicians (Maxine Fetterly and Robert Roberson) from the Atlantic Hydrographic Section. While examining records, contacts were identified, and data were rejected if the background

trace appeared as though it might obscure possible contacts. The HDAPS Contact Utility Program was used to compute the contact's height off the bottom and its position.

Contacts were considered significant if they had a height of at least 1 meter or a notable shape or pattern, and they appeared on adjacent tracks.

There were no diver investigations or developments for this survey. In accordance with project instructions, this is left for another ship to accomplish next year.

F. SOUNDING EQUIPMENT

A Raytheon Digital Survey Fathometer (DSF) 6000N echo sounder was the only sounding equipment used to determine water depth during the survey. The DSF 6000N produced an analog record of a high frequency (100 Khz) and low frequency (24 Khz) depth. The high frequency depths were digitized and then recorded by the HDAPS acquisition system.

The following is a list of sounding equipment serial numbers and days of use:

S/N	DOY
A111N	223, 225-321
A122N	208-223, 224
C066	233

Daily accuracy tests were performed on the DSF 6000N by electronic technicians. At the start of survey H-10392, various DSF problems were encountered with the analog trace. Electronic technicians switched echo sounders several times in an effort to acquire a better echogram. Frequent preventive maintenance kept the DSF working throughout the survey. At no time was the quality of data compromised. Any records that were not readable were rejected and rerun.

G. CORRECTIONS TO SOUNDINGS

Nine velocity tables were used during survey H-10392. A SEACAT Conductivity, Temperature and Depth (CTD) profiler (s/n 286) was used to collect velocity data. The CTD profiler was last calibrated on January 24, 1991. Calibration coefficients were applied via program Velocity. A copy of the calibration report is included in the calibration folder submitted with this survey.

A data quality assurance (DQA) check was completed for every cast. The DQA check consisted of recording the temperature and density

of a bucket sample using a thermometer and hydrometer. The temperature and density were then compared to the cast using the DQA subroutine in the CAT program. CTD casts used for this survey were made on the following days:

DOY	Vel.Table#	Latitude	Longitude	Depth
209	1	27°47'24"N	96°52'30"W	17.6 m
218	2	27°47'06"N	96°48'00"W	28.3 m
232	3	27°48'05"N	96°53'54"W	24.0 m
238	4	27°45'59"N	96°44'22"W	29.4 m
255	5	27°45'06"N	96°44'54"W	29.5 m
261	6	27°45'09"N	96°45'06"W	35.3 m
276	7	27°41'44"N	96°45'46"W	28.3 m
289	8	27°45'06"N	96°44'54"W	30.3 m
319	10	27°44'54"N	96°45'06"W	36.4 m

The velocity program picked significant depths to describe the water column sound velocity profile. The resulting correctors were entered into HDAPS velocity tables and applied to the sounding data during acquisition or post processing. The cast data are included in Separate IV.*

On October 3 (DOY 276), data were acquired prior to conducting a CTD cast. Velocity table seven was applied to the data collected on October 3 (DOY 276) during post processing.

Settlement and Squat was determined on August 5 (DOY 217), 1991, in Corpus Christi Channel, Cut "A" range. The values were determined by making several runs with the ship at various speeds past a mooring platform where an observer with a level was stationed. Level readings of a stadia rod stationed on the ship were recorded on each run, and at-rest readings were recorded between each run to eliminate tidal affects. Average correctors were determined for each speed and entered into an HDAPS offset table. The data and computations are included in Separate IV.*

A Heave, Roll, Pitch sensor (HIPPY), S/N 19109-C, was interfaced with HDAPS. The HIPPY output heave, pitch, and roll data to the HDAPS data acquisition computer. Soundings were automatically corrected for vessel heave.

Tidal datum for project OPR-K220-WH was mean lower low water. The operating tide stations at Corpus Christi, Texas, (877-5870) and Port Isabel, Texas, (877-9770) were used as control for datum determination. Verbal contact was made with Mr. Larry Nieson of the Atlantic Operations Group (N/OMA1213), and he confirmed that the stations were working properly during the period of survey operations. There were no leveling requirements for this project. The reference for predicted tides was Galveston, Texas. The

*DATA FILED WITH FIELD RECORDS.

following time and height correctors were entered into the HDAPS tide tables and applied during acquisition or post processing:

Time Correctors		Height
High Water	Low Water	Corrector
-1 hr 30 min	-1 hr 30 min	x1.28

Contours of the preliminary sounding plots revealed discrepancies in the depths between adjacent survey lines. In all cases where discrepancies occurred, adjacent lines were surveyed days and in some cases weeks apart. On some lines where rejected data had been rerun on a later date, the sounding overlap also revealed sounding discrepancies. One of these discrepancies, on B-north at latitude 27°49'41"N longitude 96°56'55"W, equaled 0.8 meters. All the corrector tables were verified and no obvious problems were identified.

We suspect the long distance from the reference station and more significantly the steady winds typical for this area affected the near-shore tidal height. The contours should be smoother after application of real time tides. APPROVED TIDES APPLIED DURING OFFICE PROCESSING.

One possible problem may arise in the application of real time tides. The tide gauge at Corpus Christi is at the head of the bay. Corpus Christi Bay has a barrier island to break the wind and has restricted openings which retard the movement of water. The local weather may affect the tides at the head of the bay differently than it does the coastal tides.

The static draft correction used throughout the survey was 3.2 meters. This was confirmed by pneumatic depth gauge on October 28 (DOY 301), 1991. The Transducer Depth Determination report is included in Separate IV. DATA FILED WITH FIELD RECORDS.

Leadline comparisons with the DSF6000N were attempted on two occasions, but were unsuccessful because of difficulty measuring the depth over an extremely soft bottom. A depth comparison between the DSF 6000N and a 3D Instruments Incorporated, pneumatic gauge (SN 138921-30) was conducted on October 28 (DOY 301), 1991. The following observations were made:

pneumatic gauge (feet)	DSF 6000N (meters)
47.4	11.2
47.6	11.2
47.5	11.2
47.4	11.2
47.4	11.2
47.4	11.2
47.4	11.2
47.4	11.2
47.4	11.1
47.4	11.2
Average depth = 47.4 ft	11.2 m
x.3048	+3.2 m (Draft)
14.4 m	14.4 m

The pneumatic depth gauge measured the true water depth. The DSF 6000N measured the depth below the transducer.

The pneumatic gauge was last calibrated on February 27 (DOY 58), 1991. A copy of the calibration slip is included in the calibration folder submitted with this survey. Systems checks were completed in accordance with Hydrographic Survey Guideline number 55. The system check data are included in the Transducer Depth Determination Report. DATA FILED WITH FIELD RECORDS.

Sounding corrections were applied to the high frequency (narrow) beam of the DSF 6000N soundings.

H. CONTROL STATIONS SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

All geodetic positions were referenced to NAD 83. Six horizontal control stations were used for this survey: three stations were occupied with Falcon Mini-Ranger positioning equipment, and three were occupied with ARGO positioning equipment.

The geographic positions (GP's) of all stations occupied were surveyed or verified to third-order, class I standards. Station descriptions and GP's are included for each site in Appendix III.

Two Falcon stations were placed on water tanks and offset positions computed from the center of the tanks to the rails where the electronics were placed. WHITING originally computed the offsets using methods that did not adhere to third-order class I standards. The Falcon offset positions were re-surveyed at the beginning of September to third-order, class I standards, and an error of 15.34 meters was discovered on one station. The other station was in error by 1.7 meters. The erroneous and corrected positions for the Falcon stations are as follows:

Port Aransas Tank Eccentric (station 205)

Erroneous position: 27°-49'-47.531" N 97°-03'-49.421" W
Corrected Position: 27°-49'-47.566" N 97°-03'-49.371" W
Offset: 1.7 meters

Port Aransas Mustang Tank Eccentric (station 206)

Erroneous position: 27°-45'-06.430" N 97°-07'-29.160" W
Corrected position: 27°-45'-06.889" N 97°-07"-28.929" W
Offset: 15.3 meters

These position errors affect the ARGO calibrations conducted from July 28 (DOY 209) through September 18 (DOY 261), 1991. The calibrations and subsequent hydrographic positions were corrected before this survey was submitted.

I. HYDROGRAPHIC POSITION CONTROL SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

The DM-54 Automatic Ranging Grid Overlay (ARGO) system, operated in the range-range mode, was the primary positioning system used during survey operations. The Falcon Mini-Ranger 484 short-range positioning system was used for calibrating the ARGO stations. Hybrid positioning was occasionally used when one of the Falcon stations was included in the navigation solution along with two ARGO stations.

The ship's position was determined by the intersection of multiple lines of position from the shore-based stations. HDAPS records included the station codes used for each positioning fix, an error circle radius (ECR), and a maximum residual, which were used as a measure of how accurate each fix is. Survey data were acquired and plotted at a scale of 1:10,000, but 1:20,000-scale accuracy standards were met (i.e. ECR @ 1.5mm = 30 m and maximum residuals @ 0.5 mm = 10 m). Position busts were identified on the rough track plot as obvious fliers. If reliable positions existed on both sides of the flier, the questionable position was smoothed during post processing.

ARGO stations frequently malfunctioned. Station Goose (station 201) was the station that most often had problems. The range processing unit (RPU) and the antenna loading unit (ALU) were replaced on August 9 (DOY 221), 1991. During extremely high tides in late September there was evidence of flooding of the ground plane at this station. WHITING used two ARGO LOP's (Sharkys and Mata) during the times Goose malfunctioned. Sometimes a Falcon Mini-Ranger LOP was used in addition to the two ARGO LOP's.

Problems were also experienced with station MATA 1991 (station 203). The RPU was replaced on August 20 (DOY 232), 1991, but the

malfunctioning persisted. After the RPU, ALU, and power supply were replaced on August 21 (DOY 233), 1991, no other problems were encountered.

ARGO positioning equipment included:

Station	RPU	ALU	DOY
WHITING	R1083662	C1083309	208-321
201	R047851	A047846	208-221
	R047844	A047853	221-321
202	R0680312	A047858	208-321
203	R0682566	A0980304	208-232
	R0379119	A0980304	232-235
	R1085755	A0783640	235-321

Falcon baseline calibrations were performed on March 6, 1991 (DOY 65) at the Atlantic Marine Center in Norfolk, VA, and on July 31, and August 2, 1991 (DOY 212 and 214), at NAVSTA Ingleside, Texas. Baseline calibrations were performed in accordance with AMC OPORDER 86 and the Field Procedures Manual 3.1.3.2, using the HDAPS system to record and process the Falcon range data. Distances were measured using an EDMI. Correctors were entered into an HDAPS C-O (computed-observed) table before survey operations began. Falcon baseline data can be found in Separate III. DATA FILED WITH FIELD RECORDS.

Falcon Mini-Ranger 484 positioning equipment included:

Station	Code	Serial #	DOY	RPU	RT
WHITING	-	-	208-214	D0004	E2917
	-	-	214-321	D0004	E2960
204	A	G3571	208-214	-	-
	7	E2917	214-321	-	-
205	8	G3471	208-214	-	-
	A	G2571	214-321	-	-
206	9	F3222	208-214	-	-
	C	F3296	214-321	-	-

ARGO stations were calibrated at the beginning of each survey leg and whenever the maximum residuals persistently exceeded the tolerance of 0.5 mm at the scale of the survey (or 10 m). The HDAPS primary verses secondary method of calibration was utilized. With this method, the ship was positioned at the calibration site with the Falcon stations set up as the primary positioning system and the ARGO stations as the secondary system. The HDAPS system provided a comparison of the Falcon position with each ARGO station. The ARGO whole and partial lane correctors for each station were displayed on the computer screen. Ten comparisons were obtained by performing a screen dump when the Falcon maximum

residuals were less than 10 meters and the signal strengths were greater than 15. The ARGO whole and partial lane correctors were averaged for the ten observations and applied using the delta range function in the ARGO control display unit.

The position errors of the Falcon shore stations affected the ARGO partial lane correctors applied to the data collected between July 28 (DOY 208) and September 18 (DOY 255), 1991. The ARGO calibrations that were conducted during this period were recomputed off-line with the MicroVax program CALIB using an updated station table and the original Falcon and ARGO range data. New ARGO partial correctors were computed and the affected survey data were repositioned using the HDAPS program RECOMP or POINT. Permission was obtained from Commander Christopher Lawrence, Chief Atlantic Hydrographic Section, to perform the position recomputation. A summary of the original and recomputed ARGO partial lane correctors can be found in Separate III.*
SEE ALSO SECTION 1.D. OF THE EVALUATION REPORT.

The output listings from program RECOMP and POINT are also submitted in a separate cahier included with the survey data.

Data collected on days 209 and 218 were rejected because when the ARGO calibrations were recomputed, the inverse distance between the fix and check fix exceeded 10 meters in all cases.

A side effect of the position recomputation was a general increase in the residuals when compared to the data collected on-line. Program RECOMP calculated the best position possible using the Houtonbous algorithm, but only a portion of the data available on-line is logged. After recomputation, the residuals in some areas exceeded the tolerance of 0.5mm at the scale of the survey, due to fewer data being used in the calculation of residuals. This is not necessarily an indication of less accurate positions.

Offsets for positioning and survey equipment were acquired from historical data, and entered into the HDAPS offset table. A diagram and table of offsets is included in Separate III.*

Accuracy requirements were met as specified in the Hydrographic Manual and Field Procedures Manual. At no time was the quality of data compromised. Any records that did not meet the accuracy requirements were rejected and rerun.

J. SHORELINE SEE ALSO SECTION 2.D. OF THE EVALUATION REPORT.

No shoreline existed in the survey area.

*DATA FILED WITH FIELD RECORDS.

K. CROSSLINES SEE ALSO SECTION 3.9. OF THE EVALUATION REPORT.

A total of 31 nautical miles of crosslines were run on H-10392 and equaled 6 percent of main-scheme lines. One-hundred and fifty sounding comparisons showed excellent agreement, well within Hydrographic Manual guidelines. Only soundings that were very nearly coincident were compared. The average difference between crossline and main-scheme soundings was 0.1 meter. The standard deviation was 0.20 meter. Few soundings exceeded 0.4 meter and no soundings exceeded 0.6 meter. A few soundings that were not coincident but close were off by more than 0.6 meter. A summary of the comparison can be found in Appendix F.

L. JUNCTIONS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

The eastern edge survey H-10392 junctions with survey H-10399 (E sheet), which was conducted in conjunction with this survey. Survey H-10392 had 200-percent SSS coverage and survey H-10399 had 100 percent coverage. The junction overlap between the sheets ranged from 50 meters to 340 meters with an average overlap of 199 meters. Forty-six H-10392 soundings were compared with soundings from H-10399. The average difference was 0.1 meter. The maximum difference between soundings was 0.6 meter with a standard deviation of 0.16 meter. A summary of the comparison can be found in Appendix F.*

The southeastern edge survey H-10392 junctions with the northwest corner of survey H-10402 (C sheet), which was conducted in conjunction with this survey. Survey H-10392 had 200-percent SSS coverage and survey H-10402 had 100 percent coverage. There were no holidays in the SSS swath coverage. Twenty H-10392 soundings were compared with soundings from H-10402. The average difference was 0.2 meter. The maximum difference between soundings was 0.6 meter with a standard deviation of 0.23 meter. A summary of the comparison can be found in Appendix F.*

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6.9. OF THE EVALUATION REPORT.

Sounding comparisons with four prior surveys were completed. All prior surveys used NAD 27, therefore for comparison purposes a datum shift was applied to H-10392 in accordance with the Field Procedures Manual For Hydrographic Surveying. The prior surveys completed in 1938 all used Mean Low Water as the tidal datum and later surveys used Mean Lower Low Water. No correction was applied to correct for the difference in tidal datum.

Survey H-6395 was completed in 1938 at a scale of 1:20,000. Most of survey H-6395 was to the west of H-10392, therefore only 12 soundings were compared. H-6395 did not reveal any dredging, so no comparisons were made with soundings in the dredged channel.

*DATA FILED WITH FIELD RECORDS.

The sounding comparison with H-6395 showed fair agreement. The average sounding difference was 0.1 meter, with a high standard deviation of 0.98 meter. The average depth difference was 0.6 percent of the average depth.

Survey H-6402 was completed in 1938 at a scale of 1:40,000. The western edge of survey H-6402 covered the eastern portion of H-10392. Fifty soundings from H-10392 were compared with soundings from H-6402 and they showed fair agreement. The average difference between soundings was 0.1 meter, with a high standard deviation of 0.70 meter. The average depth difference was 0.4 percent of the average depth.

Survey H-10205 was completed in 1985 at a scale of 1:20,000 and covered almost the entire area of this survey. One hundred soundings from survey H-10392 were selected and compared to soundings at the same positions on survey H-10205. The sounding comparison showed good agreement. H-10392 had an average difference 0.5 meter deeper, with a low standard deviation of 0.26 meter. The average depth difference was 2.8 percent of the average depth.

Survey D-107 was completed in 1989 8-89 at a scale of 1:40,000. Survey D-107 covered approximately one-third of the area surveyed on H-10392. Thirty soundings from H-10392 were compared with soundings from D-107. The comparison showed excellent agreement with survey H-10392. The average difference was 0.3 meter, with a low standard deviation of 0.30 meter. The average depth difference was 1.3 percent of the average depth.

D-107 showed excellent agreement, and H-10205 showed good agreement with H-10392. The soundings from survey H-10392 were consistently deeper than both prior surveys. Only 5 out of 130 soundings compared were shallower, and the standard deviation for comparisons with both surveys was low. The difference could be from inaccurate tide correctors and/or steady weather conditions. This should be looked at again after real tides are applied to the data. APPROVED TIDES APPLIED DURING OFFICE PROCESSING.

The area surveyed was fairly flat, sloping slightly to seaward. This agreed with all prior surveys.

On the southwest corner of the sheet the dredged channel and a slight shoal in the channel, commonly referred to as the "Bar" by the local pilot association, was encountered. The dredged channel begins approximately 3 NM east of the jetties. It has a width of approximately 200 meters, and the minimum sounding was 15.0 meters. Approximately 800 meters seaward of buoy "7" the width of the channel, at a least depth of 15.0 meters, is restricted to 100 meters. The sides of the channel at this point shoal to a depth of 14.3 meters. Approximately 500 meters seaward of buoy "7" the

channel widens and gets deeper. The bar was located between buoys "7" and "8", on the western edge of the area surveyed. The least depth the WHITING found was 17.6 3 meters. The proximity of the buoys, jetties and the heavy traffic prevented WHITING from developing this feature. This feature is not a hazard to navigation and no further investigation is recommended. CONCUR

A CHARTED DANGEROUS SUNKEN WRECK, PA

AWOIS item 7911, (wreck of a USCG amphibious airplane at approximate position latitude 27°50'30"N, longitude 97°01'38"W) ORIGINATING WITH FE295WD(1973), was within the sheet boundaries but outside the survey area, and was in water too shallow for WHITING to survey. No investigation was attempted. We recommend a smaller vessel investigate the item. CONCUR NO CHANGE IN CHARTING IS RECOMMENDED.

A CHARTED DANGEROUS SUBMERGED OBSTRUCTION, PA (65 FT REP)

AWOIS item 4163, (old sea buoy lying on bottom located at position latitude 27°47'30"N longitude 96°57'62"W, originated from a RUDE and HECK survey conducted in 1973, FE-295WD. The AWOIS listing required 400-percent SSS coverage to disprove the item. We surveyed the complete search radius with 200-percent side scan coverage in the course of conducting the area survey. The contact was found and no further SSS coverage was conducted. The search area was flat, with a mud bottom. Two contacts (fix # 1640.48S, 4090.65S, and 4090.61P) were found in 19.5 meters of water on the southern edge of the search area, and one contact (fix # 2522.17P and 2500.59P) in 18.7 meters on the northern edge of the search area. Both contacts were approximately 500 meters from the center of the search radius. We believe that the contacts (1640.48S, 4090.65S, and 4090.61P) on the southern edge of the search radius are the old sea buoy and anchor. These contacts are also the closest to the positions described in prior surveys. The following is a list of contact positions:

North contact

	contact	computed ht.	latitude	longitude	
					POS. #
1)	2522.17P 92522	1.8 m	27°47'56.198"N	96°57'21.222"W	PLOTTED 17 OBSTR(A)
	~~2500.59P~~	~~0.4 m~~	~~27°47'56.342"N~~	~~96°57'22.333"W~~	INSIGNIFICANT

South contacts

	contact	computed ht.	latitude	longitude	
2)	1640.48S 91640	1.1 m	27°47'28.238"N	96°57'24.261"W	18' OBSTR(A)
	~~4090.65S~~	~~1.1 m~~	~~27°47'27.107"N~~	~~96°57'24.516"W~~	INSIGNIFICANT
3)	4090.61P 94091	1.2 m	27°47'25.907"N	96°57'23.945"W	18' OBSTR(A)

NO CHANGE IN CHARTING IS RECOMMENDED.

~~No chart recommendations are made at this time~~. WHITING recommends a diver investigation for positive identification and least depth determination. IT IS RECOMMENDED THAT THE ABOVE OBSTR(A)'S BE CHARTED IN ACCORDANCE WITH CARTOGRAPHIC ORDER 04/89, DATED 3 JULY, 1989. ADDITIONAL WORK HAS BEEN ASSIGNED TO THE NOAA SHIP HECK ON THESE ITEMS.

An error was found in the AWOIS list for the history of AWOIS item 4163. The history references paragraph 3 from CL1555/73 as the old

sea buoy at an erroneous position of latitude 27°45.20'N, longitude 96°59.44'W. FE-295WD, which was the investigation that CL1555/73 originated from, has a different position for the sea buoy which corresponds with the findings of this survey. WHITING recommends reference to CL1555/73, LNM58/73 and NM52/73 be deleted from the history of AWOIS 4163 and a new reference to FE-295WD; section K, paragraph 2, be included in the history for AWOIS 4163. CONCUR

A CHARTED DANGEROUS SUBMERGED OBSTRUCTION, WITH A DANGER CURVE,
AWOIS 7557 (hang at 42 feet at latitude 27°48'37"N longitude 96°59'48"W) originated from FE-295WD (1973) The AWOIS listing required 400-percent SSS coverage to disprove the item, which had a 200-meter search radius. We completed 400-percent coverage without finding any contacts. The search area was located at the mouth of the dredged channel and was approximately one meter deeper in the center than the north and south edge. The depth ranged from 14.2 to 15.7 meters. WHITING recommends deletion of the obstruction plotted at latitude 27°48'38"N longitude 96°59'48"W. CONCUR

A CHARTED DANGEROUS SUBMERGED OBSTRUCTION, WITH A KNOWN DEPTH OF 36 FT, AND A DANGER CURVE,
AWOIS 7910 (obstruction charted at latitude 27°49'30.17"N longitude 97°00'50.68"W) originated from a WHITING survey H-10205 (1985) conducted in 1985. The AWOIS listing required 400-percent SSS coverage to disprove the item, which had a 200-meter search radius. The search area was located just to the north of the dredged channel. The depth ranged from ~~12.3~~ 11.9 to ~~13.0~~ 12.4 meters. We completed 400-percent with the exception of one small area that had 300-percent coverage due to a system failure at the end of one line. No contacts were found in the search area. At least three contacts (fix # 1540.14S, 1540.15P, 1540.16P, 4039.56P, 4039.57P) were found during the area survey, 560 meters west of the center of the search radius, and may be related to AWOIS 7910. The depth around the contacts is 12.9 meters. The contacts are on the north edge of the dredged channel, very near buoy "6". The following is a list of contact positions:

Contact	POS #	Computed ht.	Latitude	Longitude (45 PLOTTED)
1540.14S	91546	1.0 m	27°49'30.883"N	97°01'10.442W
1540.15P	91545	0.2 m	27°49'29.753"N	97°01'11.084W
1540.16P	91546	0.7 m	27°49'30.500"N	97°01'11.106W
~~4039.56P~~		~~0 m~~	~~27°49'31.584"N~~	~~97°01'11.389W~~ INSIGNIFICANT
~~4039.57P~~		~~0 m~~	~~27°49'31.083"N~~	~~97°01'11.649W~~ INSIGNIFICANT

WHITING recommends deletion of the obstruction charted at latitude 27°49'30.17"N longitude 97°00'50.68"W, ~~and addition of a charted obstruction at latitude 27°49'30.68"N longitude 97°01'11.00"W (the average position of the above contacts).~~ WHITING also recommends a diver investigation of the contacts found to the west of the AWOIS item 7910 search radius AT AN OPPORTUNE TIME. CONCUR
SEE ALSO SECTION 1.D. OF THE EVALUATION REPORT.

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

Survey H-10392 was compared with an enlargement (1:10,000) of chart 11307, 30th ed., Nov. 12/88; scale 1:80,000. Chart 11307 had 56 soundings in the survey area. All were compared and showed good agreement. The average difference was 0.4 meter (soundings from H-10392 being generally deeper) with a standard deviation of 0.5 meter. The average depth difference was 2.7 percent of the average depth.

Survey H-10392 was also compared with an enlargement (1:10,000) of chart 11309, 30th ed., Dec. 2/89; scale 1:40,000. This chart only covered the western portion of the survey. It had 30 soundings in the survey area. All were compared to soundings from survey H-10392, and showed fair agreement. The average difference was 0.6 meter deeper with a standard deviation of 0.9 meter.

There were three platforms (rigs) on "B" sheet. GP's for the rigs were acquired by placing a person on each rig and recording sextant angles to landmarks with known GP's. Program NAVUTL was used to calculate a GP for each rig from the sextant angles. There were not enough visible objects to acquire a sextant check angle. Rig positions were verified by obtaining DP's to the rigs with the ship using the same method that was used for the buoys (see section P, Aids to Navigation). The three platforms were found to be charted correctly. However, the charted name of one rig was found to be incorrect. The charted name was T-USA-MI-721L-**8** and the correct name is T-USA-MI-721L-**B**. The DP's acquired with the ship ranged from 35 to 44 meters different from those acquired by sextant. This distance is less than the width of the symbol used on the chart at the scale (1:80,000) of charts 11307 and 11313. Rig computations can be found in Appendix G.* The following is a list of verified rig names and sextant GP's:

Rig Name	Latitude	Longitude
COG-MI-721L-A	27°51'~~47.41~~ 48.97"N	96°58'~~46.86~~ 48.94"W
T-USA-MI-721L-B	27°52'09.6~~3~~ 5"N	96°58'~~41.06~~ 42.35"W
TI-MI-851S-C	27°51'~~10.68~~ 11.60"N	96°59'~~03.93~~ 06.14"W

The following charted rigs have been removed, and need to be deleted from charts 11307 and 11313.

	CHARTED POSITIONS	
Rig Name	Latitude	Longitude
unlabeled	27°51.62'N	96°58.87'W
TI-MI-721L-D	27°51.40'N	96°58.87'W

* DATA FILED WITH FIELD RECORDS.

A CHARTED DANGEROUS SUNKEN WRECK, PA, AND A DANGER CURVE,

WHITING did not investigate AWOIS item 7907, (42-foot F/V reported sunken approximate position, latitude 27°47'~~30.0~~31.15"N, longitude 97°00'00.~~0~~95"W). It was within the sheet boundaries but outside the survey area and it was not assigned. NO CHANGE IN CHARTING IS RECOMMENDED.

AN UNCHARTED DANGEROUS SUNKEN WRECK, PA,

AWOIS item 7859, (37-foot F/V Destiny Lane, approximate position latitude 27°49'~~36~~37.41"N longitude 97°00'00.95"W) originated from the Coast Guard LNM 29/90. The search radius was 3000 meters and required 200-percent SSS coverage for disproval. The area survey covered approximately 75 percent of AWOIS item 7859 search area with 200-percent side scan coverage. The remainder of the search area was in water too shallow for WHITING to survey. Although two areas with distinctive sonar returns were found in the search radius, nothing was found that fit the description of the wreck. The depth surveyed in the search area ranged from 11.5 to ~~16.7~~17.8 meters. Sonar returns in the first area showed a peculiar shape and did not have much of a shadow. In the second area sonar returns indicated either an object or a deep scour, so WHITING logged it as another contact. The following is a list of fix numbers for the two contacts found:

	Contact	Computed ht.	Latitude	Longitude	
1)	~~817.05S~~	~~1.2 m~~ 0.0	~~27°50'34.468"N~~	~~97°00'18.666"W~~	INSIGNIFICANT
	~~1325.10S~~	~~0 m~~	~~27°50'36.478"N~~	~~97°00'19.129"W~~	INSIGNIFICANT
2)	~~1764.62S~~	~~0.4 m~~	~~27°49'32.629"N~~	~~96°59'26.171"W~~	INSIGNIFICANT
	~~1810.04S~~	~~0.9 m~~	~~27°49'32.663"N~~	~~96°59'25.805"W~~	INSIGNIFICANT

WHITING recommends a future field unit complete the SSS coverage of the search radius and investigate the two contacts found in the area. ~~No chart recommendation is made at this time~~. NO CHANGE IN CHARTING IS RECOMMENDED.

A CHARTED DANGEROUS SUNKEN WRECK, PD, AND A DANGER CURVE,

AWOIS item 4164, (Scorpion, a 25-foot P/C, capsized at latitude 27°47-~~30N~~31.10"N longitude 96-55-~~00W~~00.94, PA) originated from a Coast Guard LNM. ~~38/91~~. The AWOIS listing required 200-percent SSS coverage to disprove the item, which had a 3000-meter search radius. Approximately one-third of the search area for AWOIS item 4164 was within the survey area. The rest of the search radius was on field sheet WH-10-2-91. The portion of the search radius that was within the survey area of this field sheet was surveyed with 200-percent SSS coverage during the course of the area survey. Depths ranged from ~~20~~18.8 to ~~20.4~~21.2 meters. No contacts were found in this portion of the search area. Further discussion of this AWOIS item will be in the descriptive report for H-10399. NO CHANGE IN CHARTING IS RECOMMENDED.

A CHARTED DANGEROUS SUNKEN WRECK, PA, AND A DANGER CURVE,

AWOIS item 7908, (46-foot F/V "MR.B" reported sunk at latitude 27°50'~~00~~21.09"N longitude 96°56'00"W, PA) originated from a Coast Guard LNM. ~~34/88~~. The AWOIS listing required 200-percent SSS coverage of the 3000-meter search radius to disprove the item. The southern half of the search radius was covered with 200-percent SSS coverage. A separate plotter sheet was set up to cover the northern half of

the search radius, which was outside the survey limits for H-10392. The addition of the search area for item 7908 increases the width of the survey area beyond allowable limits. Mr Rudolph Sanoki, of the Atlantic Hydrographic Section indicated that the survey could be split during office processing. The portion of the search radius to the north of the survey area was surveyed with 100-percent SSS coverage. There are a few small holidays in the 100-percent coverage. We did not have sufficient time to finish the investigation. The search area was flat and ranged from ~~16.5~~ 14.9 to ~~19.5~~ 20.0 meters. No contacts were found within the search radius for AWOIS item 7908. WHITING recommends a future field unit finish the investigation of the northern half of the AWOIS item. ~~No chart recommendation for AWOIS item 7908 is made at this time~~. NO CHANGE IN CHARTING IS RECOMMENDED.

A couple of contacts were found during the course of the area survey on the southwestern edge of the survey area next to buoy "7". One contact is very likely the charted wreck at latitude 27°~~2~~4'9.6'N longitude 97°01.9'W. The depth of the area around the contact was 14.9 meters. The contact (fixes 1616.34S and 4069.49S) did not have much of a shadow, but did have a distinct shape. Radial lines come out of the center, and there is evidence of drifting sand to one side of the contact. Close and to the west is another possible contact (fix 1616.23S) that may be a large rock, a remnant of the jetty, or an old buoy anchor. WHITING recommends further investigation to verify these contacts and acquire a least depth.*

	Contact	Computed ht.	Latitude	Longitude
1) *	~~1616.34S~~	~~0 m~~	~~27°49'38.255"N~~	~~97°01'47.085"W~~
*	~~4069.49S~~	~~0 m~~	~~27°49'37.354"N~~	~~97°01'46.437"W~~
2) *	~~1616.23S~~	~~0.8 m~~	~~27°49'38.506"N~~	~~97°01'49.311"W~~

On August 24 (DOY 236), a fishing vessel (F/V) hung its net on an obstruction in the fairway. While the F/V was still hung, we towed the SSS fish approximately 50 meters from the F/V. Two passes were made. A small distinct contact was observed on the sonargrams. The area survey sonargrams covering the same area were investigated and a small contact with a small shadow was found. The depth at the contact was 15.3 meters. The following is a list of the fix numbers and positions for the hang:

Contact	Computed ht.	Latitude	Longitude
* ~~1912.47S~~	~~0.3 m~~	~~27°48'56.096"N~~	~~97°00'16.362"W~~
* ~~3684.62S~~	~~0 m~~	~~27°48'56.265"N~~	~~97°00'15.574"W~~
* ~~3689.18S~~	~~0 m~~	~~27°48'55.408"N~~	~~97°00'16.103"W~~

Another possible contact was seen 180 meters to the east. The sonargram showed a nondescript object with a small shadow. The positions are as follows:

* ALL CONTACTS ARE CONSIDERED INSIGNIFICANT. NO FURTHER INVESTIGATION IS NEEDED.

Contact	Computed ht.	Latitude	Longitude
1905.17P	1.9 m Φ.9	27°48'56.164"N	97°00'09.450"W
1912.75P	0 m	27°48'56.492"N	97°00'09.411"W
3712.36S	0.3 m	27°48'56.955"N	97°00'11.540"W

WHITING recommends a dive investigation by a future field unit to determine the least depth. No chart recommendation is made at this time.

Several contacts were found during the area survey that were not on the chart. They were confirmed by second SSS images. The first was in the center of the fairway but was far enough east that it was not near the dredged channel. The depth of water was 16.3 meters and the bottom was flat. The SSS image is not distinct, but it does have a shadow. The following are the two positions for the contact:

Contact	Computed ht.	Latitude	Longitude
1560.70S	1.0 m Φ.Φ	27°48'09.849"N	96°58'55.374"W
1492.36P	0.1 m	27°48'10.736"N	96°58'54.278"W

WHITING recommends further investigation to confirm the contact and determine a least depth. No chart recommendation is made at this time.

Other uncharted contacts were found in the southeastern portion of the sheet. The depth around the contacts was approximately 15.9 meters. The following are the positions for what appears to be the most significant contact:

contact	computed ht.	latitude	longitude
4098.58S	1.4 m Φ.1	27°46'38.850"N	96°57'42.522"W
2086.63P	0.5 m	27°46'39.200"N	96°57'40.996"W

Another uncharted contact was found 160 meters northwest of these contacts. It was not seen on the sonargram of the adjacent line. The area around the contact was flat and approximately 19.1 meters deep. The position is as follows:

Contact	Computed ht.	Latitude	Longitude
4098.23S	0.5 m	27°46'41.646"N	96°57'46.902"W

WHITING recommends a dive investigation of all contacts in the southeastern portion to determine the most significant contact and least depth. No chart recommendation is made at this time.

There were no additional dangers to navigation found in the survey area. CONCUR

* ALL CONTACTS ARE CONSIDERED INSIGNIFICANT. NO FURTHER INVESTIGATION IS NEEDED. NO CHARTING RECOMMENDATION IS NEEDED.

O. ADEQUACY OF SURVEY SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

This hydrographic survey is adequate to supersede prior surveys of the area. No part of this survey is considered to be substandard. DO NOT CONCUR SEE ALSO SECTION 1.b. OF THE EVALUATION REPORT.

This survey is a complete basic hydrographic survey, with the exception that contacts identified by side scan sonar have been left for further investigation and least depth determination by another field unit, in accordance with project instructions.

P. AIDS TO NAVIGATION SEE ALSO SECTION 7.d. OF THE EVALUATION REPORT.

There were five buoys in the survey area. To position the buoys, WHITING maneuvered within 10 to 20 meters of a buoy, marking the geographic position (GP) of the ship, bearing, and range to the buoy. Two such positions, each on opposite sides, were acquired for each buoy. NAVUTL was used to calculate a buoy DP for each ship GP acquired. The two DP's were then averaged for the final buoy GP.

Buoy "AP" marked the beginning of the buoyage system for Aransas Pass. Buoys "3" and "6" mark the dredged portion of the channel as the bottom begins to shoal. Buoys "7" and "8" marked the channel at the end of the jetties. All characteristics of the buoys were field verified by WHITING personnel. The following is a list of buoy GP's and their characteristics:

Buoy #	Color	Light	Latitude	Longitude
AP	RW	W MO(A)	27°47'32.72"N	96°57'23.35"W
3	G	G FL(4s)	27°48'44.46"N	97°00'10.96"W
6	R	R FL(4s)	27°49'30.75"N	97°01'13.85"W
7	G	G FL(2.5s)	27°49'40.38"N	97°01'50.91"W
8	R	R FL(2.5s)	27°49'51.83"N	97°01'52.01"W

Calculations for the buoy GP's can be found in the supplemental data cahier. The position acquired for the buoys were compared with the published positions in the Light List. All positions compared favorably, within the accuracy of the positions published in the Light List, with the exception of buoy "3". The WHITING position for buoy "3" differs from the published and charted position by 588 meters to the southeast. WHITING will submit a chart letter to correct the discrepancy.

Q. STATISTICS

Number of Positions	4920
Nautical Miles of Main-Scheme Sounding Lines	538
Nautical Miles of Crossline Sounding Lines	31
Square Nautical Miles Surveyed	24
Days of Production	12
Detached Positions	16
Bottom Samples	2
Tide Stations	0
Current Stations	0
Number of CTD Casts	9
Magnetic Stations	0

R. MISCELLANEOUS

Side scan sonar contacts that are recommended for further investigation are included in Separate V.*

Bottom samples from H-10392 were taken in accordance with the project instructions. Most of the survey area had been previously sampled during survey H-10205 in 1985. Only two samples were required. Both samples were submitted to the Smithsonian Institution, as directed by the project instructions. Appropriate documentation can be found in Separate II.*

The following samples were taken:

Sample	Fix	Type	Latitude	Longitude
BS #1	2119	~~gty~~ br silt	27°46'19.10"	~~27°4~~56'10.~~49~~"
BS #2	2120	~~gty~~ br silt	27°47'12.66"	~~27°4~~55'54.62"

During strong tidal exchanges, a significant tidal rip was encountered in the proximity of the Aransas Pass jetties, which were just west of the survey limits. During moderate and heavy weather, the water at the east end of the jetties was very rough.

Side scan sonar operations were limited to a speed of 6 knots or slower. WHITING's main engines were not designed to run for prolonged periods under such a light load. Excessive engine wear results, as well as a heavy build up of oil in the exhaust piping, which increases the chance of stack fire. For this reason, WHITING suspended side scan operations twice daily to run the engines under full load. All of this time was used to advantage in such tasks as running crosslines, repairing equipment, transiting, and processing survey data.

* DATA FILED WITH FIELD RECORDS.

Many problems and items for improvement were noted for the HDAPS software. A report on "bugs" and suggested improvements will be submitted to the Hydrographic Surveys Branch under separate cover.

S. RECOMMENDATIONS SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

Acquiring an acceptable SSS trace in shallow water was extremely difficult. The seas had to be nearly flat before WHITING could survey in 15 meters or less of water due to surface return. Even with good conditions, WHITING had difficulty surveying in less than 12 meters of water due to excessive prop wash interference. WHITING should not be used for side scan surveys in water depths less than 12 meters.

Some of the copies of prior surveys supplied to the WHITING were not to scale. Careful reproduction, to scale, would greatly facilitate the process of conducting comparisons with prior surveys. Enlargements of prior surveys to the plot scale of the survey being conducted would be even more helpful in making comparisons. CONCUR

Aransas Pass is the only entrance for deep draft vessels to Corpus Christi Bay. Aransas Pass is on the northern edge of chart 11307. This is very inconvenient for navigating when approaching from the Gulf. WHITING recommends reorienting chart 11307 so that Aransas Pass is on the central latitude of the chart. CONCUR

There is considerable field time and logistics involved in setting up and operating an ARGO and Falcon network. Time is spent recovering stations, establishing new control, setting up and dismantling towers, conducting calibrations, and all the lost time keeping the systems operating. There is no question that a satellite positioning system is the most productive, hence cost effective, positioning system available. WHITING could have been much more productive if a satellite positioning system were provided. CONCUR

T. REFERRAL TO OTHER REPORTS

The following reports will be submitted as part of OPR-K220-WH.

Horizontal Control Report
Electronic Control Report
Chart Evaluation Report
Coast Pilot Report

CONTROL STATIONS as of 4 Dec 1991

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
201	A	028:07:31.119	096:58:52.429	0	250	1646.7	299670.0	2	07/23/91	GOOSE 1987
202	A	027:47:32.060	097:05:13.451	0	250	1646.7	299670.0	1	07/23/91	SHARKEYS 1991
203	A	028:35:55.276	095:58:34.815	0	250	1646.7	299670.0	3	07/23/91	MATA 1991
204	F	027:47:33.070	097:05:14.862	7	250	0.0	0.0	7	07/23/91	KNOLL 1934
205	F	027:49:47.568	097:03:49.374	38	250	0.0	0.0	A	09/19/91	PORT ARANSAS TANK ECC, 1991
206	F	027:45:06.889	097:07:28.928	43	250	0.0	0.0	C	09/19/91	PORT ARANSAS MUSTANG TANK ECC, 1991

NOAA FORM 76-40
(8-74)

Replaces C&GS Form 567.

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [x] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [ ] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

- [ ] TO BE CHARTED
- [ ] TO BE REVISED
- [x] TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office)	STATE	LOCALITY	DATE
NOAA SHIP WHITING	TEXAS	APPROACHES TO CORPUS CHRISTI	12-17-91

The following objects HAVE [x] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.	JOB NUMBER	SURVEY NUMBER	DATUM
OPR-K220-WH-91	N/A	H-10392	NAD 83

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
UNLABELED	PLATFORM REMOVED	27° 51'	37"	96° 58'	52"		F-VIS 10-3-91	11307 11313
TI-MI-721L-D	PLATFORM REMOVED	27° 51'	24"	96° 58'	52"			
	Prev. rep							
	L-28/92							

RESPONSIBLE PERSONNEL		
TYPE OF ACTION	**NAME**	**ORIGINATOR**
OBJECTS INSPECTED FROM SEAWARD	Richard P. Floyd, CDR, NOAA Chief of Party	☒ PHOTO FIELD PARTY ☒ HYDROGRAPHIC PARTY – Whiting ☐ GEODETIC PARTY ☐ OTHER *(Specify)*
POSITIONS DETERMINED AND/OR VERIFIED	Joseph A. Seitz	FIELD ACTIVITY REPRESENTATIVE
	Chief Survey Technician, Whiting	OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		☐ REVIEWER ☐ QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64,

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

☆ U.S. GPO:1975-0-665-080/1155

Submitted By:

Richard A. Fletcher
Lieutenant junior grade, NOAA

Reviewed By:

Nancy L. Crews
Lieutenant, NOAA
Operations Officer

Approved By:

Richard P. Floyd
Commander, NOAA
Commanding Officer

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 6, 1992

MARINE CENTER: Atlantic

OPR: K220-WH

HYDROGRAPHIC SHEET: H-10392

LOCALITY: Gulf of Mexico, Southwest Texas Coast

TIME PERIOD: July 27 - November 17, 1991

TIDE STATION USED: 877-5870 Corpus Christi (Bob Hall Pier), Texas
Lat. 27° 34.8'N Lon. 97° 13.0'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 20.58 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.6 ft.

REMARKS: RECOMMENDED ZONING

Times and heights are direct on Corpus Christi (Bob Hall Pier), Texas (877-5870).

Note: Times are tabulated in Central Standard Time.

for Richard L. Crum Jr.
CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10392

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
ARANSAS PASS										1
MEXICO, GULF OF (title)										2
TEXAS (title)										3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
				Approved:						15
										16
				Chief Geographer						17
										18
				MAR 10 1993						19
										20
										21
										22
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										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

07/12/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10392

NUMBER OF CONTROL STATIONS		6
NUMBER OF POSITIONS		3653
NUMBER OF SOUNDINGS		25853
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	230	05/22/92
VERIFICATION OF FIELD DATA	272	02/02/93
ELECTRONIC DATA PROCESSING	130	
QUALITY CONTROL CHECKS	41	
EVALUATION AND ANALYSIS	126	07/09/93
FINAL INSPECTION	7	07/06/93
TOTAL TIME	806	
ATLANTIC HYDROGRAPHIC SECTION APPROVAL		07/13/93

OFFICE OF CHARTING AND GEODETIC SERVICES
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT

SURVEY NO.: H-10392 FIELD NO.: WH-10-1-91

Texas, Gulf Of Mexico, Approach to Aransas Pass

SURVEYED: 27 July through 17 November 1991

SCALE: 1:20,000 PROJECT NO.: OPR-K220-WH-91

SOUNDINGS: RAYTHEON DSF-6000N Fathometer, EG&G Model 260 Side Scan Sonar

CONTROL: CUBIC WESTERN DM-54 ARGO/MOTOROLA Falcon 484 Mini-Ranger (Range/Range)

Chief of Party.....R. P. Floyd

Surveyed by.....C. B. Greenawalt
.....N. L. Crews
.....R. A. Fletcher
.....D. E. Bixby
.....K. A. McNitt
.....K. G. Taggart
.....E. W. Berkowitz
.....J. A. Seitz
.....F. R. Cruz
.....E. A. Myers
.....R. L. Harris

Automated Plot by.....XYNETICS 1201 Plotter (AHS)

1. INTRODUCTION

a. This is a combined basic hydrographic/side scan sonar survey. Side scan sonar was operated simultaneously with the fathometer during survey operations. Side scan sonar contacts located by the present survey during hydrographic operations were not investigated by the present survey. In cases where the side scan sonar was used to determine the estimated depth of a feature, the item is shown on the present survey with the upper case letter 'A' in parenthesis. This note is shown on the present survey smooth sheet in proximity to the title block. See also memorandum titled "Showing Estimated Side Scan Sonar Depths on Smooth Sheets", dated 23 February 1989, for an explanation of the note shown on the survey smooth sheet. Depths on these obstructions were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track.

b. During office processing, a problem with the survey's hydrographic position control was discovered. Problems exhibited the following symptoms:

1) Oil platforms did not plot in the same position if more than one position was taken on the item. Sextant angles taken from oil platforms did not match detached positions determined by the electronic positioning system.

2) On a number of occasions, when two positions were obtained for the same contacts, they differed by 30 to 50 meters. Contact position discrepancies were very evident on adjacent lines. For example, the first one hundred percent side scan sonar coverage was run at 80 meter line spacing. Distinct contacts discovered on the first one hundred percent did not appear at the predicted offset on the second one hundred percent. Some contacts offset discrepancies were on the order of 50 meters.

The following is a list of irregularities associated with the ARGO positioning system which could have caused the position problem:

a) Land path problems due to poor site selection may be evident with ARGO station MATA. The station was located on the mainland and transmitted across the intracoastal waterway and the barrier beach. This set up may have produced land path problems resulting in range errors.

b) Flooding of the ground plane for ARGO station GOOSE during survey operations may have cause phase shifts which are not detectable during survey operations.

AHS personnel conducted numerous check calculations with the hopes of isolating the precise cause of the contact position discrepancies. The discrepancies exist whether course made good or gyro heading were used in the contact computation algorithm. The examination of residuals of the multiple LOP fixes, yielded no evidence of positional irregularities, however, there were some areas where poor geometry was employed. We therefore recognize that a positioning problem exists, however, we can only speculate on the cause.

In making a determination of how this survey should be evaluated for charting, the following specifications were considered:

1) Section 1.2.3. of the HYDROGRAPHIC MANUAL recommends that "the survey scale is generally twice as large

as that of the largest scale chart published or proposed for the area."

2) Section 1.A.1. of the International Organization Standards for Hydrographic Surveys states"...the scale adopted should never be smaller than that of the intended chart.

3) Section 1.B. 1.5. of the International Hydrographic Organization (IHO) Standards states that " the position of soundings, dangers, and all other significant features should be determined from field observations, relative to shore control or directly using satellite positioning such that there is a 95 percent probability that the true position lies within a circle of radius 1.5 mm at the scale of the survey about the determined position."

Using this requirement, the allowable error at a 1:20,000 scale survey would be 30 meters. Since the maximum discrepancy in side scan sonar positions on this survey was approximately 50 meters, AHS believes that this survey does not meet 1:20,000 positional standards. It is recommended that the survey be downgraded to 1:40,000 standards.

Although it is recommended that the survey be downgraded in scale, we believe that the depth data are adequate to supersede currently charted depths on the 1:40,000 and 1:80,000 scale charts.

Side scan sonar contacts deemed significant have been displayed on the smooth sheet as discussed in section 1.a. of this report. The contacts have been assigned to the NOAA Ship HECK for final disposition.

c. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections H., I. and T. of the Descriptive Report.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the survey datum and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27 datum move the projection lines 1.099 seconds (33.8 meters or 1.7 mm at the

scale of the survey) north in latitude, and 0.953 seconds (26.0 meters or 1.30 mm at the scale of the survey) west in longitude.

b. There is no shoreline within the limits of the present survey.

3. HYDROGRAPHY

a. Soundings at crossings are in agreement and comply with the criteria found in sections 4.6.1 and 6.3.4.3. of the HYDROGRAPHIC MANUAL.

b. The standard depth curves were drawn in their entirety.

c. The development of the bottom configuration is considered adequate.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports conform to the requirements of the HYDROGRAPHIC MANUAL, FIELD PROCEDURES MANUAL, and SIDE SCAN SONAR MANUAL. The following should be noted:

a. The field unit did not adequately locate floating aids to navigation as required by section 4.2.1. of the Project Instructions.

b. The field unit did not cross reference side scan sonar contacts as required by section 3.2.1. of the SIDE SCAN SONAR MANUAL. Cross referencing would have help detect a position problem or system problem. See also section 1.b. of this report.

5. JUNCTIONS

H-10399 (1991) to the east
H-10402 (1991) to the southeast

Standard junctions were effected between the present survey and junctional surveys.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-6395 (1938) 1:40,000
H-6402 (1938) 1:40,000

H-10205 (1985) 1:20,000
D-107 (1988-89) 1:40,000

The four prior surveys listed above cover the present survey in its entirety.

Prior survey H-6395 1938) was superseded by prior survey H-10205 (1985) and requires no discussion in this report.

Prior survey depths from H-6402 (1938) shows a general trend of being 0^6 m shoaler than present survey soundings.

Prior survey depths from H-10205 (1985) shows a general trend of being 0^3 to 0^6 m shoaler than present survey soundings.

Prior survey depths from D-107 (1988), formerly H-10270 1988), show a general trend of being 0^3 m shoaler than present survey soundings.

The present survey is adequate to supersede the above prior survey depths within the common area. See also section 1.b. of this report.

b. Wire Drag

FE-295WD (1973) 1:40,000

Survey FE-295WD (1973), formerly survey H-9397WD (1973), was processed using modified methods. Only hangs, groundings, and clearances were verified and evaluated. There was no smooth area and depth sheet depicting clearance depths generated. Therefore, there is no comparison with clearance depths. Two hangs originate with prior survey FE-295WD (1973) and have been given Automated Wreck and Obstruction Information System (AWOIS) item numbers. The numbers are AWOIS item #4163 and #7557. The items are adequately discussed in section M., pages 14-15 of the Descriptive Report and require no further discussion.

7. COMPARISON WITH CHART 11300 (29th. Edition, 29 Sept. 1990)
11307 (31st. Edition, 16 March 1991)
11309 (31st. Edition, 31 Aug. 1991)
11313 (19th. Edition, 30 June 1990)

a. Hydrography

The charted hydrography originates with the previously

discussed prior surveys and requires no further consideration. The hydrographer makes an adequate chart comparison in section N. pages 16-19 of the Descriptive Report.

The present survey is adequate to supersede currently charted depths on the 1:80,000 scale charts. See also section 1.b. of this report for a discussion on adequacy.

b. Controlling Depths

There are no conflicts between the present survey soundings and the projected depths for Port Aransas Entrance Channel.

c. Dangers to Navigation

There were no Dangers to Navigation submitted by the field unit on this survey. No dangers were noted during office processing.

d. Aids to Navigation

There are five floating aids to navigation shown on the present survey. These aids appear adequate to serve their intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

This survey complies with the Project Instructions except as noted elsewhere in this report.

9. ADDITIONAL FIELD WORK

This ia an adequate basic survey. Additional work is required to verify or disprove items discussed in sections M. and N., pages 14-19, of the Descriptive Report. See also section 1.b. of this report for additional work recommendations.

Robert Snow
Cartographic Technician
Verification of Field Data

Norris A. Wike
Cartographer
Evaluation and Analysis

Leroy G. Cram
Senior Cartographic Technician
Verification Check

APPROVAL SHEET
H-10392

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Leroy G. Cram Date: 07/08/93
Leroy G. Cram
Chief, Hydrographic Processing Team B
Atlantic Hydrographic Section

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Nicholas E. Perugini Date: 07/13/93
Nicholas E. Perugini, LCDR, NOAA
Chief, Atlantic Hydrographic Section

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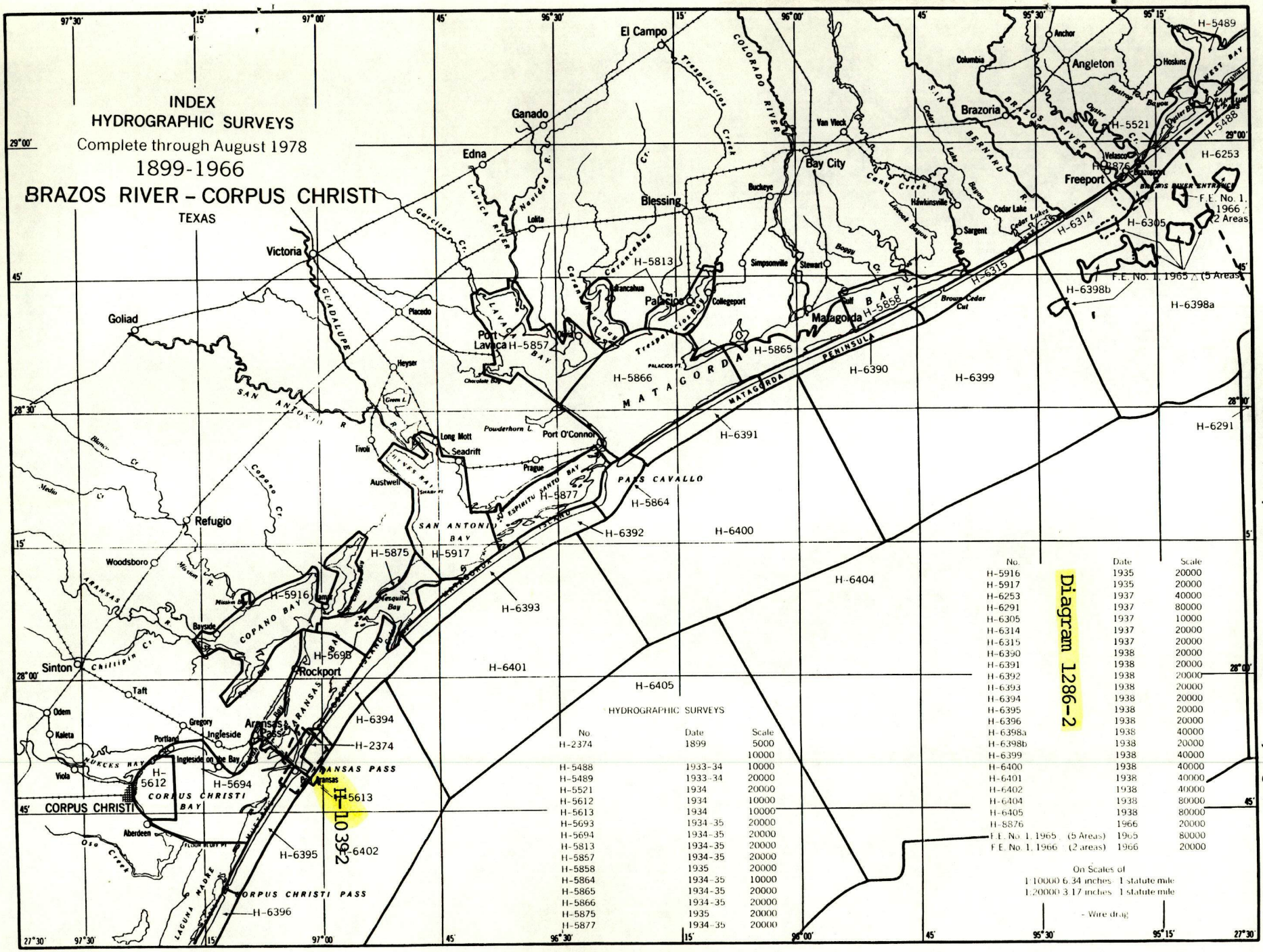
Final Approval:

Approved: for J. Austin Yeager Date: 12-7-94
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey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DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Survey
Rockville, Maryland
Hydrographic Index No. 90 C

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10392

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
11312	9/17/93	L. Ashburn	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 2
11309	9/17/93	L. Ashburn	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 52, Ther cht 11312
411	2-10-94	Jerry Schneider	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 65 EXAM NC - 3E AREA
11300	3-10-94	Jeff Taylor	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 46 EXAM, N/C - scale
11313	4/1/94	Ray Schiff	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 40
11307	4/2/94	Ray Schiff	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 42
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED